

IV. Reading MODIS files in Matlab

MODIS images can also be imported into Matlab using the *hdfread* function. The *bit* and *get_hdfmeta* functions were translated from the IDL code. These examples are identical to the IDL examples in the previous sections.

To start Matlab, type *matlab* at a command prompt.

Example of Reading in products with the *hdfread* function in MATLAB

1. Define the filename:

```
>> fname='MODOCL2B.A2001095.1605.004.2002186051608.hdf'  
>> l2dir='/net/home/modis/images/l2/'
```

2. Load the chlor_a:

```
>> chlor_a2=hdfread(strcat(l2dir,fname),'chlor_a_2');
```

3. Load the ‘Rainbob’ color palette:

```
>> figure  
>> load rainbob  
>> colormap(rainbob)
```

4. Since products are stored as integers in the MODIS hdf files, they must be converted to floating point values using a translation stored as a ‘Slope’ and ‘Intercept’ value in the hdf file. These values can be obtained by using the *get_hdfmeta* function.

```
>> [name, units, slope, yint, eq] = get_hdfmeta(strcat(l2dir,fname), 'chlor_a_2');
```

5. Translate chlor_a2 integer array into floating point values and ‘reverse’ the image:

```
>> chlor_a2 = double(chlor_a2)*double(slope) +double(yint);
```

6. Display the image:

```
>> image( chl2gry(chlor_a2))
```

Example of Reading in Quality flags using the *bit* function in Matlab

1. Load the quality byte for the Group 2 Level 2 product (see *NOTE 1):

```
>> quality_ocl2b = hdfread(strcat(l2dir, fname), 'quality');
```

2. The quality flag bit ‘pairs’ are described in website ‘Level 2 Quality Flag Levels’. The chlor_a2 quality flags are stored in bits 7 and 8. To access these bits, use the *bit* function:

```
>> qual_chlor_a2 = bit(quality_ocl2b, 7, 2);
```

The ‘7’ indicates the bit position, and the ‘2’ indicates the number of bits to extract. This function returns an unsigned byte with values of 0, 1, 2 and 3.

3. Load quality flag color palette:

```
>> figure  
>> load quality_colormap  
>> colormap(quality_colormap)
```

4. Display the image:

```
>> image(qual_chlor_a2)
```

Color code:

Quality 0: Green
Quality 1: Blue
Quality 2: Red
Quality 3: Black

* NOTE 1: The product groups MODOCL2, MODOCL2B, and MOD28L2 each have a 1-byte quality flag structure. The product group MODOCL2A has a 4-byte quality flag structure.

Example of using Level 3 products with the *hdfread* and *bit* functions in Matlab

1. Define the filenames:

```
>> fname1='MO04MM26.chlor_a_2.ADD2001121.004.2002211074022.hdf';
>> fname2='MO04QM26.chlor_a_2.ADD2001121.004.2002211074542.hdf';
>> l3dir='/net/home/modis/images/l3/';
```

2. Load the chlor_a2 and quality flag products:

```
>> chlor_a2_l3=hdfread(strcat(l3dir,fname1),'chlor_a_2_mean');
>> chlor_a2_qual_l3=hdfread(strcat(l3dir,fname2),'chlor_a_2_qual_b');
```

3. Get slope and intercept data, and transform the image

```
>> [name, units, slope, yint, eq] = get_hdfmeta(strcat(l3dir,fname1),
    'chlor_a_2_mean');
>> chlor_a2_l3=double(chlor_a2_l3)*double(slope) + double(yint);
```

4. Display the chlor_a2 image:

```
>> figure
>> colormap(rainbow)
>> image( chl2gry(chlor_a2_l3))
```

5. Display the chlor_a2 quality image:

```
>> colormap(quality_colormap)
>> image( chlor_a2_qual_l3)
```